What is claimed is;

1. A plasma processing apparatus that performs plasma processing on a workpiece placed on an electrode provided inside a processing chamber, comprising;

a means for temperature control provided at said electrode;

a conductive ring body encompassing the periphery of said workpiece placed on said electrode;

a first gas supply passage through which a heat transfer gas is supplied to the space between said conductive ring body and said electrode;

a means for pressure regulation that regulates the pressure of the heat transfer gas being supplied; and

a first means for control that controls said means for pressure regulation to set the temperature at said conductive ring body and the temperature at said workpiece roughly equal to each other.

2. A plasma processing apparatus according to claim 1, wherein;

said first means for control controls said means for pressure regulation based upon temperature information obtained through detection performed by temperature sensors that measure the temperature of said conductive ring body and the temperature of said workpiece.

3. A plasma processing apparatus according to claim 1, wherein;

one or a plurality of second gas supply passages through which a heat transfer gas is supplied to the space between said workpiece and said electrode are provided at said electrode separately from and independently of said first gas supply passage.

4. A plasma processing apparatus according to claim 1, further comprising;

an insulating ring body encompassing the periphery of said conductive ring body;

a means for heat application provided at said insulating ring body; and

a second means for control for controlling said means for heat application.

5. A plasma processing apparatus that performs plasma processing on a workpiece placed on an electrode provided inside a processing chamber, comprising;

a means for temperature control provided at said electrode;

a conductive ring body encompassing the periphery of said workpiece placed on said electrode;

a first gas supply passage through which a heat transfer gas is supplied to the space between said conductive ring body and said electrode;

a second gas supply passage communicating with said first gas supply passage, through which a heat transfer gas is supplied to the space between said workpiece and said electrode;

a means for pressure regulation that regulates the pressure of the heat transfer gas being supplied; and

a means for control that controls said means for pressure regulation.

6. A plasma processing apparatus that performs plasma processing on a workpiece placed on an electrode provided inside a processing chamber, comprising;

a means for temperature control provided at said electrode;

a conductive ring body encompassing the periphery of said workpiece placed on said electrode;

a first gas supply passage through which a heat transfer gas is supplied to the space between said conductive ring body and said electrode;

a second gas supply passage through which heat transfer gas at a first pressure level is supplied to the space between said workpiece and said electrode;

a third gas supply passage through which heat transfer gas at a second pressure level is supplied to the space between said workpiece and said electrode;

a first link passage for linking said first gas supply passage with said second gas supply passage, that can be opened / closed freely;

a second link passage for linking said first gas supply passage and said third gas supply passage, that can be opened / closed freely; and

a means for control that controls the length of time over which said first link passage remains open and the length of time over which said second link passage remains open to set the temperature of said conductive ring body and the temperature of said workpiece roughly equal to each other.

7. A plasma processing apparatus that performs plasma processing on a workpiece placed on an electrostatic chuck formed at a mounting surface of an electrode provided inside a processing chamber, comprising;

a means for temperature control provided at said electrode;

a conductive ring body encompassing the periphery of said workpiece placed on said electrostatic chuck; and

a thermal conductivity adjusting member provided between said electrode and said conductive ring body to set the thermal conductivity between said electrode and said conductive ring body and the thermal conductivity between said electrode and said workpiece roughly equal to each other.

8. A plasma processing apparatus that performs plasma processing on a workpiece placed on an electrode provided inside a processing chamber, comprising;

a means for temperature control provided at said electrode;

a conductive ring body encompassing the periphery of said workpiece placed on said electrode; and

a means for pressure application that applies a pressure to said conductive ring body toward said electrode and is capable of adjusting the level of pressure applied to said conductive ring body.

9. A plasma processing method for performing plasma processing on a workpiece placed on an electrode provided inside a processing chamber, comprising;

a step in which a means for temperature control provided at said electrode is adjusted to set the temperature of said electrode to a specific level;

a step in which a heat transfer gas is supplied to the space between a conductive ring body encompassing the periphery of said workpiece placed on said electrode and said electrode; and

a step in which the pressure level of the heat transfer gas being supplied is regulated so as to set the temperature of said workpiece and the temperature of said conductive ring body roughly equal to each other.

10. A plasma processing method according to claim 9, further comprising;

a step in which heat is applied to an insulating ring body encompassing the periphery of said conductive ring body to maintain the temperature of said insulating ring body at a constant level during said plasma processing.

11. A plasma processing method for performing plasma processing on a workpiece placed on an electrode provided inside a processing chamber, wherein;

said plasma processing is performed by setting the temperature of said workpiece, which is controlled by a means for temperature control provided at said electrode and the temperature of a conductive ring body encompassing the periphery of said workpiece mounted on said electrode roughly equal to each other.

12. A plasma processing method according to claim 11, wherein;

heat is applied to an insulating ring body encompassing the periphery of said conductive ring body to maintain said insulating ring body at a constant temperature level.